



Water System Master Plan and Maintenance Briefing

January 14, 2025

Introduction

The Grand Rapids Water System is the second largest community water supply in the state. We supply the highest quality of drinking water to six retail communities in the area and three wholesale communities. We will be adding another in Caledonia Township later this year.

Mission

To protect life and property by providing high-quality water services in an environmentally safe and efficient manner.

Vision

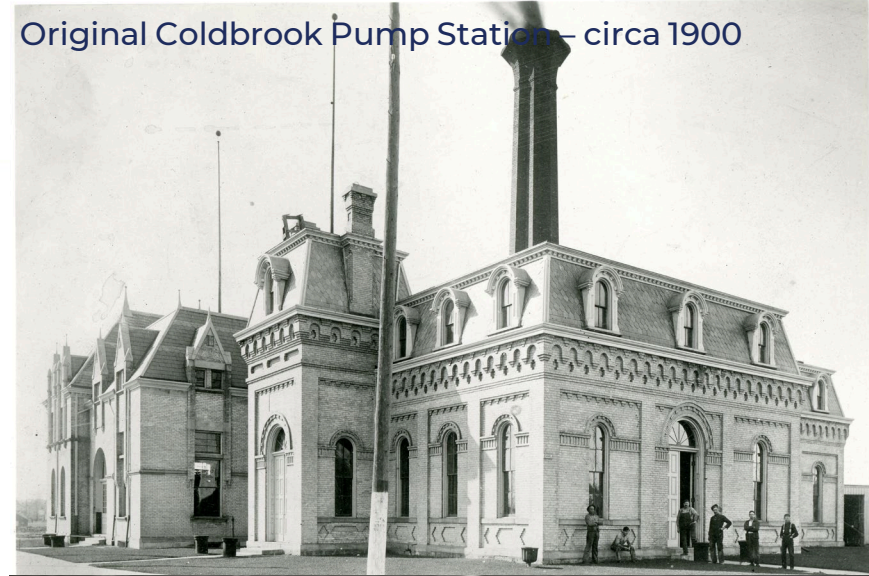
We will be an equitable, engaged partner in water quality and community health that enhances the regional economy while providing a superior customer experience.



History

- 1850 - First watermain pipes are constructed in the City – they are made of hollowed out wooden logs
- 1873 – Grand Rapids Water System Established by vote of the community – water source is Grand River
- 1912 – Monroe Avenue Filtration Plant constructed
- 1940 – Original Low Lift pump station built in current location at Lake Michigan along with 46" transmission pipeline to Monroe Plant serving ~ 39,000 residents
- 1962 - Lake Michigan Filtration Plant Built; Water treated at both Lake Michigan and at Monroe Filtration Plant
- 1990 – Second transmission pipeline constructed from Lake Michigan Filtration Plant into Grand Rapids
- 1992 – Lake Michigan Filtration Plant is expanded and second low lift pump station built; Monroe Plant is decommissioned
- 2022 – New Plate Settler Treatment process built at Lake Filtration Plant; 1962 settling basins decommissioned
- 2023 – Coldbrook Pumping Station Decommissioned and Livingston Pump Station Expanded

Original Coldbrook Pump Station – circa 1900



Franklin Reservoir Construction – Circa 1940



Service Metrics

Treatment

- Multiple intakes in Lake Michigan
- Conventional Treatment System using Disinfection, Flocculation, Sedimentation and gravel-sand filtration
- ~36 Million gallons per day (MGD) avg. daily demand
- ~73 MGD maximum daily demand
- ~90 MGD highest recorded maximum (2003)
- Seven low lift pumps ranging in capacity from 25 to 62 MGD
- Nine high lift pumps ranging in capacity from 12 to 36 MGD
- Operators on site 24/7/365 monitoring plant operations and distribution operations
- Around the clock testing of raw and finished water at the plant and daily testing in the distribution system

Distribution

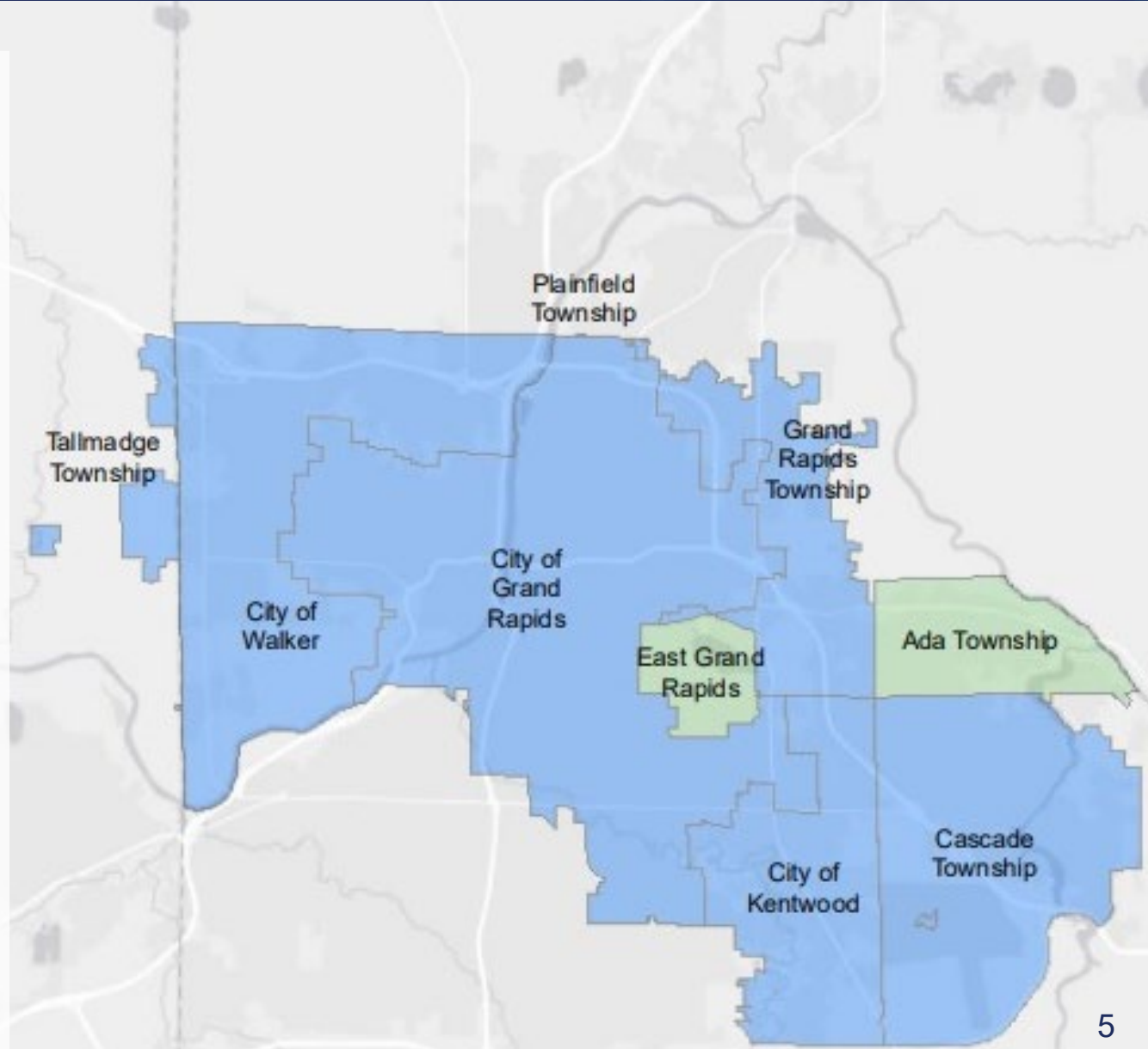
- 13 Pressure Districts
- 11 Pump stations
- 16 Storage Reservoirs/Tanks
- Nearly 1,300 miles of watermain and piping appurtenances like valves and fire hydrants



Service Metrics

Customer Service Area

- Nearly 83,000 Retail Water Customer accounts across six retail communities
- Population of 320,000 served across retail and wholesale service area
- Retail Communities Served include Cascade Township, City of Kentwood, City of Grand Rapids, Grand Rapids Township, City of Walker and Tallmadge Township
- Wholesale Communities served include large portions of Ottawa County, East Grand Rapids and Ada Township
- Replace nearly 5,000 meters per year
- Nearly 4,000 meters set up to be read remotely
- Partner with 311 for Customer Service (143,000 inquiries to 311 annually)
- Utility Business Office handles 17,000 elevated service requests annually and processes over 6,000 utility agreements annually



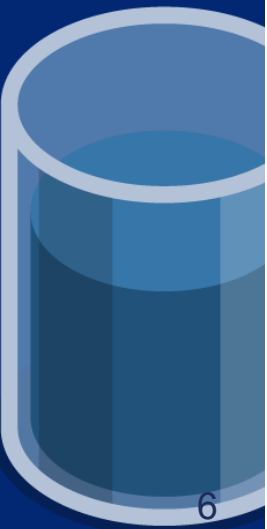
Regulatory Monitoring & Compliance

- **Safe Drinking Water Act**
Established basis for minimum standards of quality, cleanliness and treatment of drinking water in the United States
- **Lead and Copper Rule (LCR)**
Prompted use of corrosion control chemicals starting in 1994 and regular testing of properties with full lead service lines
 - In 2018, the LCR was updated to require full Lead Service Line Replacements
 - Over 7,000 have been completed with another 19,000 remaining (\$125M investment)
- **PFAS and Emerging Contaminants**
 - Quarterly testing of raw and finished water
 - Extending distribution system to areas with contaminated ground water wells

awwa.org/safe-water-drinking-act/

Protecting What Matters Most

Every person deserves safe, clean drinking water. The Safe Drinking Water Act (SDWA) works to ensure exactly that.



Regulatory Monitoring & Compliance

- EGLE is primary regulating body
- City is required to employ licensed operators to manage and run the System
 - State administered exams for F and S licenses
 - Continuous Education Credits required to renew license
 - Plant has operators on site 24/7/365
- State and EPA periodic reviews of entire system
 - Sanitary Surveys by EGLE
 - EPA Field Survey – Completed in June 2024
- Monthly Operating Reports and Water Quality Parameters submitted to EGLE
 - Plant Lab and Operators responsible for thousand of tests annually both at the plant and in the distribution system
 - Over 150 samples collected per month from the distribution system
- SCADA System allows for real time monitoring of key reporting information.
- Numerous other testing requirements, most notably Lead and Copper.
- Violations – Penalties can include monetary fines, loss of licenses, prison time, increased testing frequency, and public notification/education.



Asset Management / Comprehensive Master Plan

Comprehensive Master Plan (CMP) Required by EGLE every five years, to include:

- Population growth projections
- Water Transmission and Distribution System
- Lake Michigan Filtration Plant
- Sanitary Collection
- Water Resource Recovery Facility
- Stormwater

Critical Components of the CMP

- Hydraulic Model Calibration
- System Capacity and Reliability Assessment
- Anticipated System Expansion Improvements
- Recommended Improvements Assessment

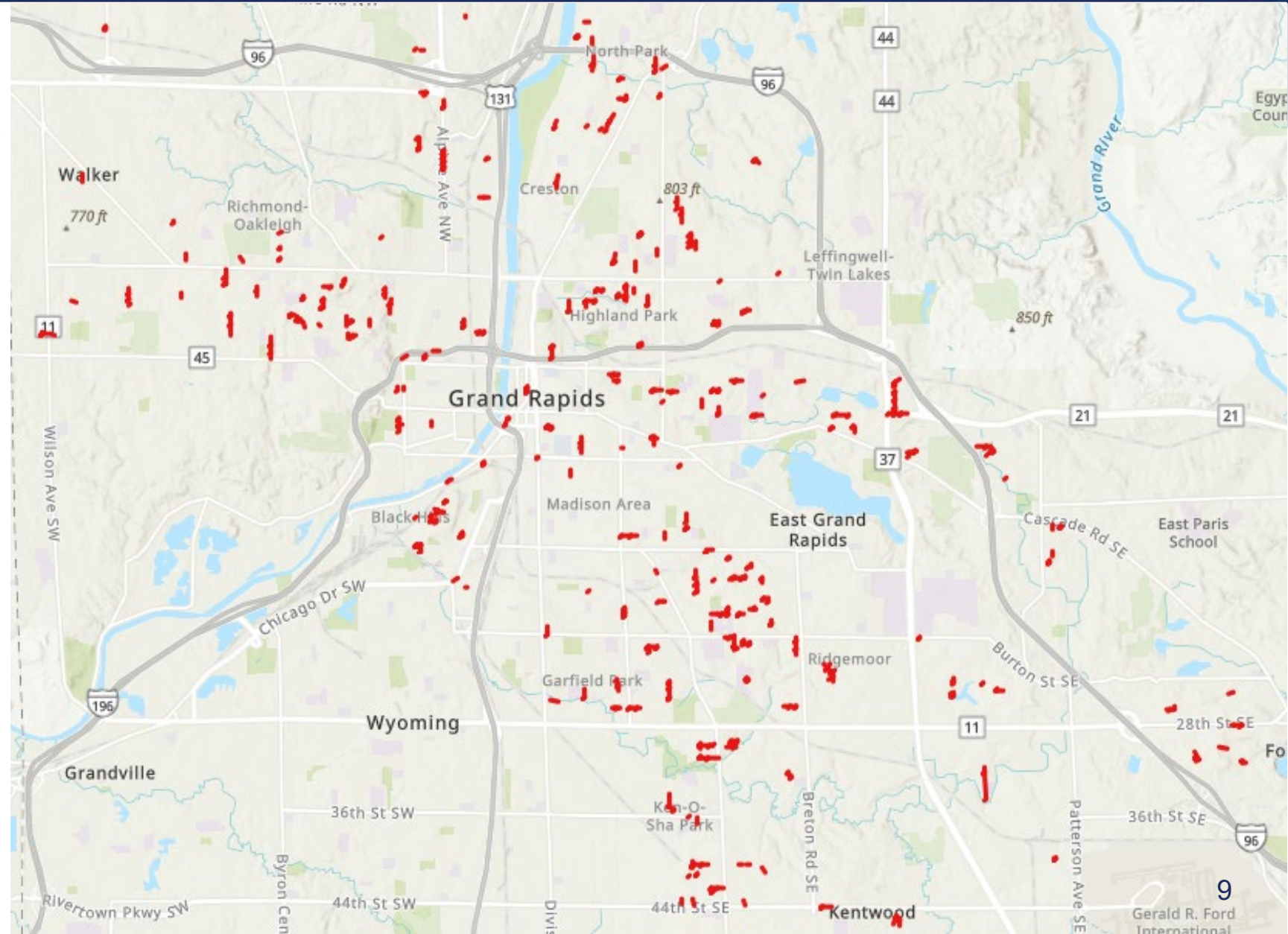
Additional Components of the CMP

- Emergency Interconnect Assessment
- Emerging Contaminant Review
- Emergency Response Plan and Cybersecurity
- Vertical Asset and Plant Assessments
 - Capacity
 - Electrical Systems
 - Treatment Assessment and Efficiency
 - Energy Evaluations
- Asset Management Inventory and Analysis
 - Linear Asset Assessments (mains, valves, pipes)
 - Vertical Asset Assessments (pumps, motors, reservoirs, high tanks)
 - Probability of failure (PoF)– chance of a leak based on historical data
 - Consequence of Failure (CoF) - impact of a leak

Asset Management / Risk Assessment

POF Risk Assessment

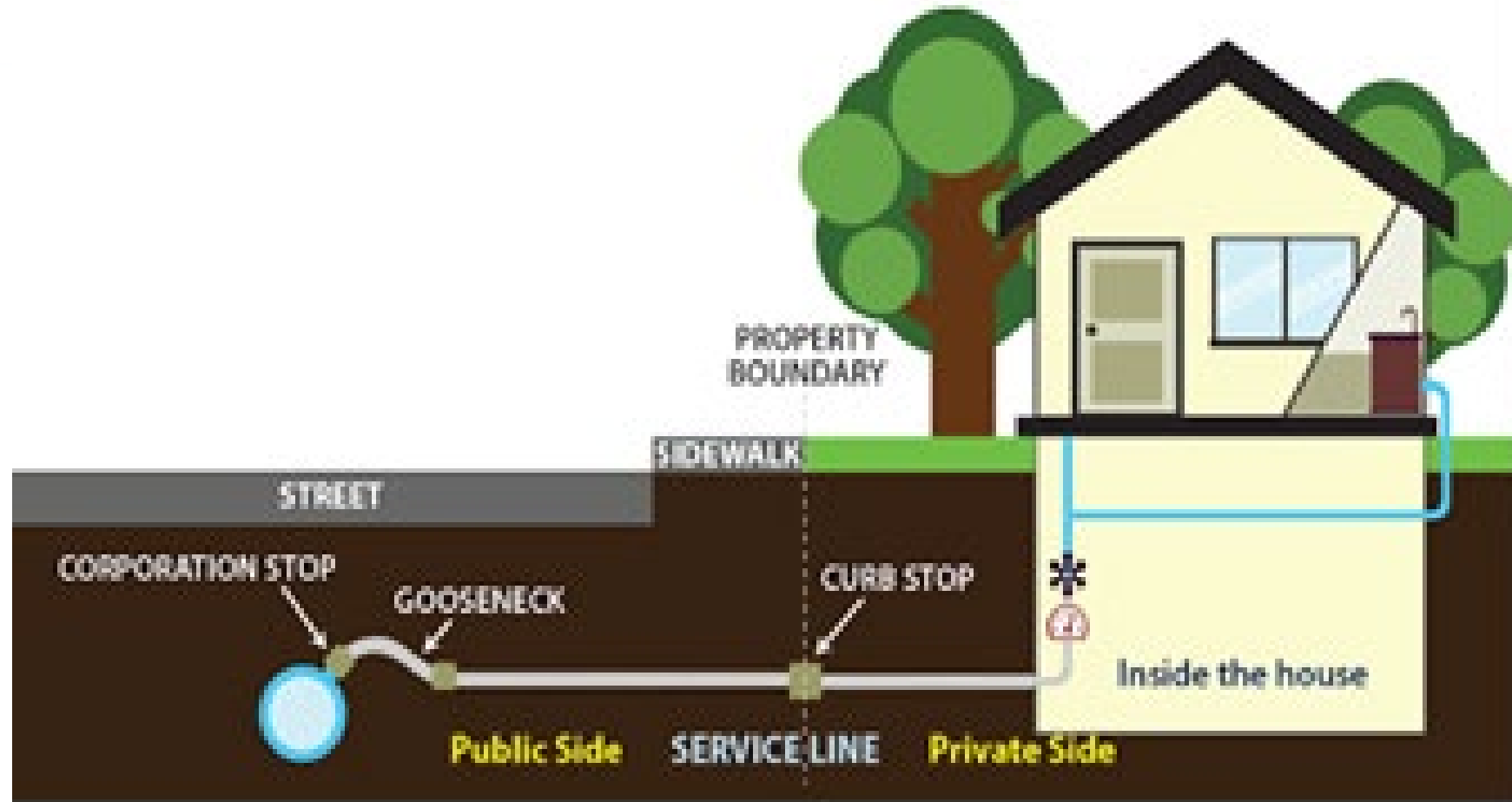
- Conducted in 2020
- Statistical analysis of existing data to identify the worst 1% of our pipe (21 miles)
- Past breaks, soil conditions, weather, pipe age
- Risk = probability to break within next few years
- 1.9 miles of pipe replaced (90 identified segments)
- Since 2020, 44 watermain breaks correctly predicted by the study (of 397 total watermain breaks)



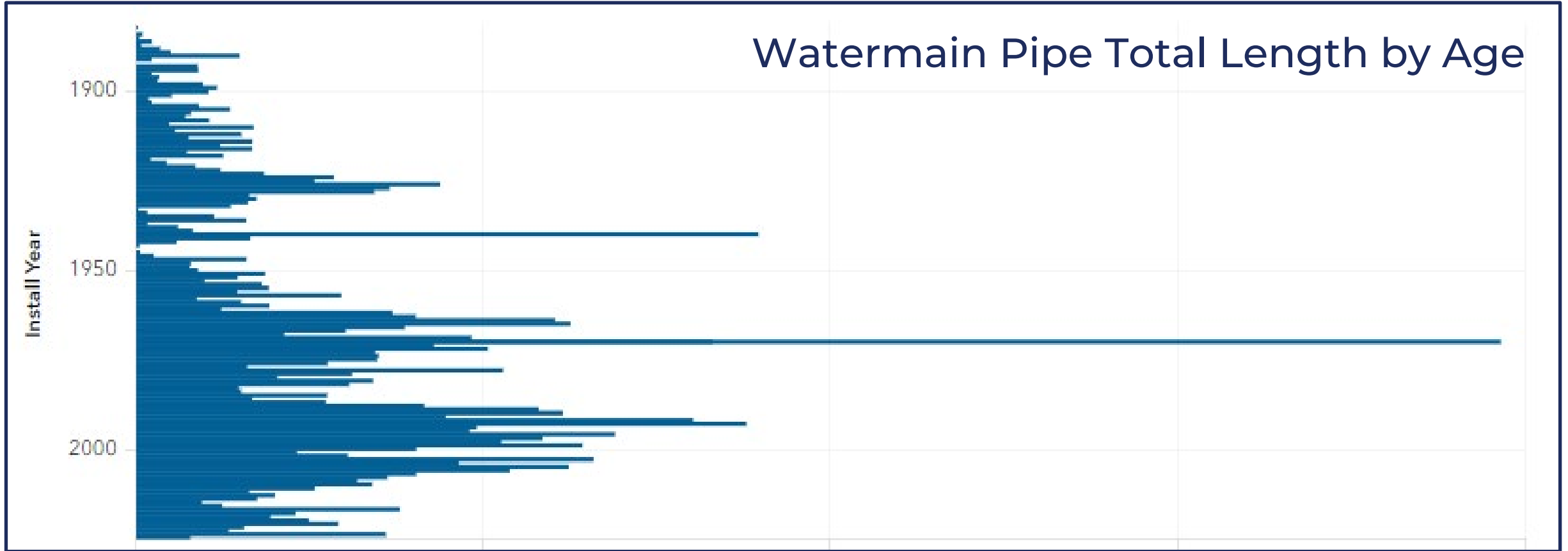
Asset Management / Risk Assessment

POF Risk Assessment

- Will be updated with 2025 CMP (Will include updates to both POF and COF)
- Tailored to GR risks and ongoing maintenance and investment approach
- Pair the data with Vital Streets surface assessments to target higher risk areas in the most cost-effective manner



Asset Management / Risk Assessment



Estimated cost to replace all assets >75 years in age is approximately \$1.5 billion

Asset Management / Capital Projects

Decision-making Factors in Development of Five-Year Capital Plans

Comprehensive Master Plan

- Capacity
- Growth
- Redundancy and Reliability

Regulatory Requirements

- New Laws or Interpretations of Existing Laws

Vital Streets and Pavement Surface Evaluation and Ratings (PASER)

- Water attempts to partner with Streets, Engineering and Mobile GR on projects with surface work planned

Asset Conditions

- Risk rating from PoF and CoF Model Assessments
- National Association of Sewer Service Companies (NASSCO) Rating
- Field Data

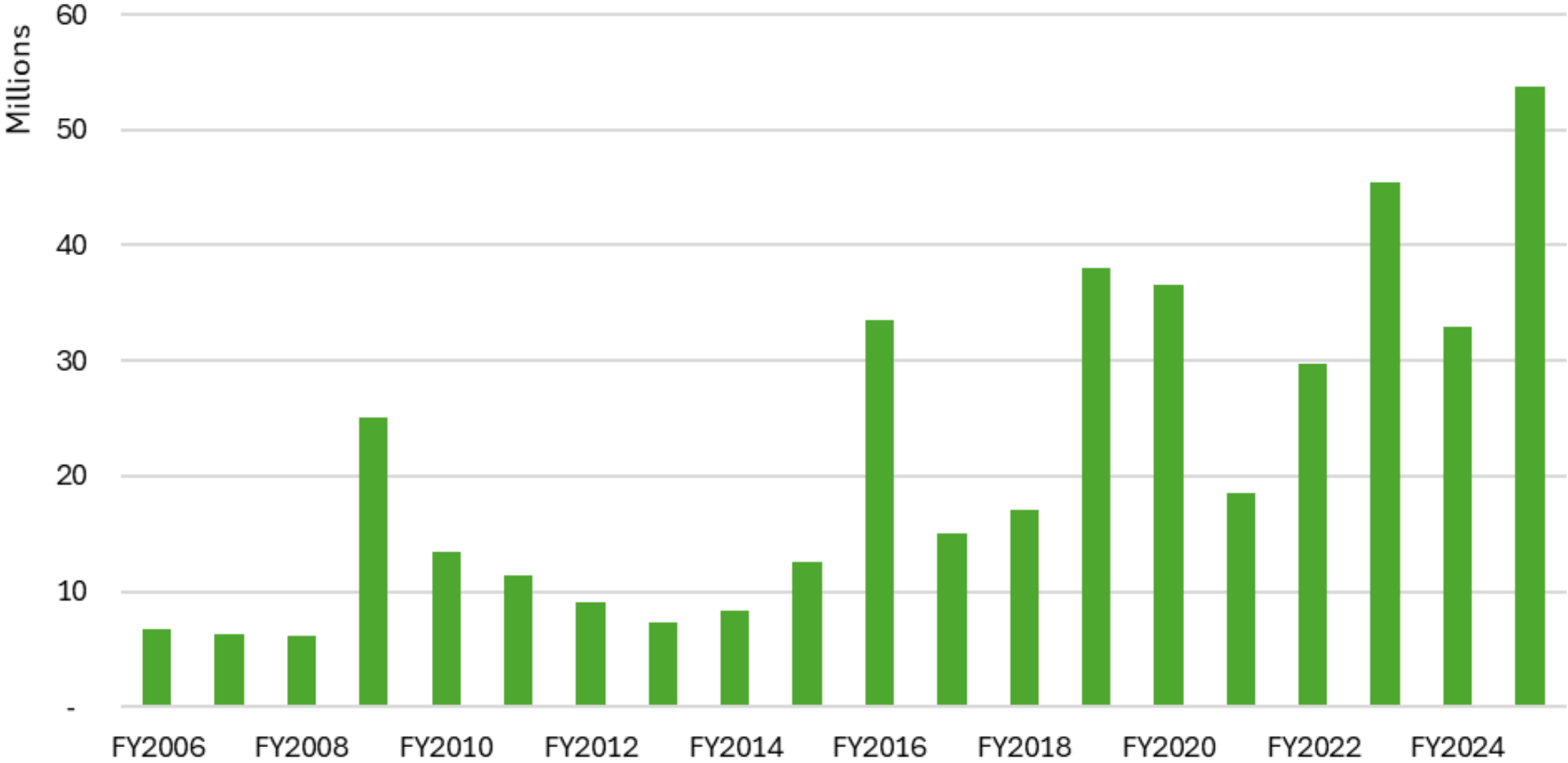
Available Funding and Rate Impacts

- We constantly look at our budgets to assess future rate impacts

Estimated FY26-FY30 Water System Capital Needs are approximately \$156M.

Asset Management / Capital Projects

Water System Capital Budget - Past 20 Fiscal Years



Asset Management / System Maintenance

- Water uses CityWorks for asset management and maintenance
- Covers all of our vertical and horizontal assets
 - 2500+ vertical water assets
 - 1300 miles of linear water assets
- Preventative vs. Corrective Maintenance
- Large Valve Program
- Tank Maintenance

The screenshot shows the Cityworks web application interface. The top navigation bar includes 'Recent Activity', 'Inbox', 'Service Requests', 'Work Order', 'GIS Search', 'Crew Manager', 'Projects', 'Facilities Room Search', and 'Inspection'. Below this, there are several tabs for different asset types, with 'Main (Water)' selected. The 'Main (Water)' tab is further divided into 'ONGOING WORK ORDERS', 'HYDRANT WORK ORDERS', '704 WORK ORDERS', 'PENDING WORK ORDERS', 'T & C WORK ORDERS', and 'COMPLETE WORK ORDERS'. Under '704 WORK ORDERS', there are sub-tabs for 'REJECTED WO to crews', 'Flow Tests', 'UNASSIGNED WATER WO', 'ASSIGNED WATER WO', 'TEMP HYDRANT WO', and 'DIG UPS FROM 704 WO'S'. The 'Water Inbox' section is active, showing a table of 'Open Work Orders (All)'. The table has columns for 'Wo', 'Description', 'Submit To', 'Status', and 'Address'. Each row includes a checkbox for selection and a link to the work order number.

Open	Print	Expand	Configure	Map	Open Work Orders (All)				
<input type="checkbox"/>	Wo	Description	Submit To	Status	Address				
<input type="checkbox"/>	569255	Trench Repair - Public Services	PSD, TRENCH 1	OPEN	1935 BRETON RD SE, City of Grand Rapids, 49506				
<input type="checkbox"/>	569223	Install New	BOUWMAN, CRAIG 1	OPEN	449 MAYNARD AVE SW, City of Walker, 49544				
<input type="checkbox"/>	569219	Inspect Hydrant	Hydrant, Issues	OPEN	1580 KENOWA AVE SW, City of Walker, 49544				
<input type="checkbox"/>	569218	Inspect Hydrant	Hydrant, Issues	OPEN	311 Northern Dr, Grand Rapids, MI, 49534				
<input type="checkbox"/>	569217	Inspect Hydrant	Hydrant, Issues	OPEN	311 Northern Dr, Grand Rapids, MI, 49534				
<input type="checkbox"/>	569216	Inspect Hydrant	Hydrant, Issues	OPEN	313 Northern Dr, Grand Rapids, MI, 49534				
<input type="checkbox"/>	569208	Operate Valve	BLUE, SHAWN 2	OPEN	4175 60TH ST SE, City of Kentwood, 49512				
<input type="checkbox"/>	569181	Hit	Hydrant, Issues	OPEN	633 RICHMOND ST NW, City of Grand Rapids, 49504				
<input type="checkbox"/>	569180	Frozen - Thaw	Hydrant, Issues	OPEN	6716 CASCADE RD SE, Cascade Township, 49546				
<input type="checkbox"/>	569156	Possible Main Break	DIETZ, FRANK	OPEN	3880 CAMELOT DR SE, City of Grand Rapids, 49546				
<input type="checkbox"/>	569078	Trench Repair - Public Services	PSD, TRENCH 1	OPEN	101 YOUELL AVE SE, City of Grand Rapids, 49506				
<input type="checkbox"/>	569074	Trench Repair - Public Services	PSD, TRENCH 1	OPEN	801 COLLEGE AVE SE, City of Grand Rapids, 49507				
<input type="checkbox"/>	569057	CB Repair	Infrastructure, Issues	OPEN	1340 MAPLEROW AVE NW, City of Walker, 49544				
<input type="checkbox"/>	569041	CB Locate	Infrastructure, Issues	OPEN	1347 BUTLER AVE SE, City of Grand Rapids, 49507				
<input type="checkbox"/>	568977	Trench Repair - Public Services	PSD, TRENCH 1	OPEN	319 MORRIS AVE SE, City of Grand Rapids, 49503				

Asset Management / System Maintenance

Common maintenance challenges

Lead Service Line Leaks

- About 250 emergency leaks per year

Watermain Breaks

- Frost Heave
- Corrosion (usually from soil or gas utilities)

Power Outages

- Investments over past 15 years in diesel and natural gas on site generators
- Additional Mobile Generators added to inventory
- Franklin and Livingston Pump Station are Dual Fed
- Six Pump Stations have onsite generators with Automatic Transfer Switches
- Classified as Z-02 priority sites with Consumers Energy



**Uncommon
maintenance
challenge – contractor
hit our hydrant**

Asset Management / System Maintenance

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Avg. Low Temp	Avg. # of Breaks
July	2	3	1	1	4	2	3	2	3	2	3	62 Degrees	2
August	0	2	4	1	4	6	5	2	9	7	9	61 Degrees	5
September	1	2	1	4	2	1	1	1	7	4	5	53 Degrees	3
October	2	7	2	4	9	4	3	2	6	5	6	42 Degrees	5
November	1	6	7	2	6	4	4	5	11	4	4	33 Degrees	5
December	9	5	17	11	6	7	8	8	16	9	18	24 Degrees	10
January	22	26	13	16	20	7	16	22	12	20	1	18 Degrees	16
February	18	8	6	6	13	6	21	17	18	8	0	20 Degrees	12
March	10	3	4	1	3	1	1	10	4	1	0	27 Degrees	4
April	1	2	0	1	4	0	1	3	2	2	0	38 Degrees	2
May	1	8	4	3	2	0	4	3	2	2	0	48 Degrees	3
June	2	0	0	3	3	2	1	3	4	7	0	58 Degrees	3
Total	69	72	59	53	76	40	68	78	94	71	46		66

**GR Water System averages one watermain break for every 18 miles of pipe.
The national average is one break for every six miles of pipe.**

Asset Management / Emergency Response

System Emergencies

- Operators use of SCADA to "feel" the System
- Electrical Issues
- Pressures and Alarms
- Mechanics, Electricians and Techs on call

Customer Emergencies

- Watermains and service lines
- 311 and after hours call center
- After hours staff on call
- Crews repair services and watermains in Right of Way
- Large scale outages use Reverse 311 and IPAWS to provide updates



Asset Management / Recent Investments

- Zinc coated ductile iron mains required since 2016 to address future corrosion
- \$3M in PRV Investments to replace aging infrastructure
- \$3M investment in Dual Electrical Feeds and Back Up Generation – Franklin, Livingston, Dean Lake, Bristol, Booster D, Mobile Generators
- Pump Firm Capacity enhancements
- ~\$40M for 7,000+ lead service line replacements since 2017
- ~\$100M in watermain replacements in the City since 2020
- \$15M replacement of 1962 upflow clarifiers with Plate Settler equipment (2022)



Asset Management / Recent Investments

- >\$5M in Wilson Pump Station pump and tank upgrades (2021)
- >\$6M in improvements to Franklin Pump Station (2023-2024)
- >\$6M in High Service pump and VFD improvements at the LMFP (2020)
- >\$11M in Livingston Pump Station and transmission mains to build redundancy to the site (2020-2022)



Asset Management / Coming Investments

- \$9M - At the LMFP for chemical containment and carbon feed improvements
- \$8M – Replace watermain and lead services lines in Burton from Division to Kalamazoo (1.9 miles)
- \$3M – Replace watermain and lead service lines in Boston from Plymouth to Calvin
- \$3M – Replace watermain and lead service lines in Godfrey from Oxford to Chestnut
- \$8M+ - Replace lead service lines in all three wards



Summary

- Primary goal of excellent customer service is being achieved.
- Watermain breaks and service leaks happen, and It is not realistic to predict the majority of future watermain breaks.
- Use advanced technology in our CMP to better predict future watermain breaks and impacts
- Continued support from citizens and local/state governments for asset replacement investments
- Develop increased balance between surface and buried asset conditions in prioritizing projects.



**Questions?
Comments?**



Thank you.